ROCKS and MINERALS

PUBLISHED MONTHLY

Edited and Published by PETER ZODAC

MARCH 1939

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BAY STATE MINERALOGICAL ASSOCIATION
CHICAGO CLUB ELECTS NEW OFFICERS
CLUB DESIRES BULLETIN EXCHANGE

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Chips from the Quarry

PETER ZODAC

We Propound A Question

There are a number of minerals which are formed as alteration products of other minerals, sometimes appearing as pseudomorphs. It very often happens that these alterations take place in a mineral cabinet some years or even months after the minerals were placed there and many miles away from their place of origin. The question we would like to ask our readers is—If these new minerals were to be labeled, what locality would you give them? Their original locality; the name of the city in which the alteration took place; or what other? Let us give you two examples.

Some years ago we stored away in our cellar, some iron pyrites in anthracite coal (from Tamaqua, Penn.) and forgot all about them. At least ten years went by before the package was brought to light and when opened the material was found to be so decomposed that all traces of the pyrite had disappeared. What was left consisted of black dirt and dirty, grayish impure melanterite. As the material was entirely worthless to us we were about to throw it away when some tiny yellow specks attracted our attention Under a magnifying glass the specks were found to be tiny sulphur crystals.

About two years ago we collected some lansfordite stalactites at Nesquehoning, Penn. Six months later the mineral, colorless and transparent, had altered completely to chalky white, opaque nesquehonite.

Suppose we were to label the two minerals. What locality should we give to each? We cannot say the sulphur crystals came from Tamaqua, Penn., as the crystals were formed in Peekskill, N. Y., over 100 miles away. And the same for the nesquehonite, pseudomorph after lansfordite, which likewise altered in Peekskill. And it would be unfair to credit Peekskill as the locality for the specimens as the minerals do not occur in this vicinity. Still the minerals are true ones and deserve recognition.

What locality would you give each one of these minerals? We would be glad to hear from all and especially from those collectors who are sticklers for correct localities giving us their views. A post card will do.

Something New

On pages 86-87 of this issue we are featuring for the first time a mineralogical crossword puzzle that was constructed by Mr. Walter P. Sachs. We hope our readers will appreciate this effort of Mr. Sachs and that they will show their appreciation by sending cards, with comments, either to us or direct to Mr. Sachs, 254 Bloomfield Ave., Caldwell, N. J.

Peter Zodac

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The Official Journal of the ROCKS and MINERALS ASSOCIATION

Whole No. 92

A Rocks and Minerals Outing to Owens Valley, California

By NICHOLAS A. D'ARCY, JR.

This article won third prize in our recent Prize Article Contest. (Editor.)

We get up before the sun and start on our three day Rocks and Minerals outing with the first stop at Little Lake, 195 miles away, and the meeting time set for 9:00 A.M. The road leads through San Fernando Valley where the rock crushers are carrying on one of Los Angeles County's most active mining programs. The valley floor is covered with recent alluvial deposits which are hundreds of feet thick. This rock has been transported from the nearby mountains and laid down in poorly sorted beds and it is now excavated, crushed and used in concrete. Just outside of San Fernando we see the mouth of Placerita canyon where the mission fathers mined gold several years before Marshall made his discovery at Sutter's Mill. This canyon still produces gold in small amounts but no regular mining operations are carried on.

The new road cuts, at the site of the old Newhall tunnel, present very interesting examples of nonconformity of deposition of sediments. Here we find a mottled sandstone cut by large lenses of clay and interspersed with irregular pockets of coarse conglomerate. The formation has been tilted and faulted and makes a very interesting study.

The Pico canyon oil field is on the far side of the summit and is the oldest oil field in California. Many of the wells have been producing for 60 years and new wells are being drilled at long and irregular intervals in this field. It is interesting to see the short wooden derricks used to drill the old shallow wells a few feet from a tall modern steel derrick used in present drilling operations.

We are soon past the town of Saugus and are in Mint canyon. It is interesting to note the loose unconsolidated sedimentary rocks while in the wide valley near Saugus and for several miles up the canyon and how the canyon narrows down when the hard igneous rock zone is entered only to widen out at the higher levels when another zone of sedimentary deposits is encountered. A side trip from the Mint canyon road leads to the Tick Canyon Sterling Borax mine where very interesting specimens of howlite, suitable for polishing, may be found on the dumps as well as colemanite and ulexite. Nearby are deposits of chalcedony nodules.

At the summit we look toward Antelope valley. The sedimentary rocks give way to igneous rocks cut in many places by dikes and veins and capped for large areas with basalt flows and cinder. The oil producing

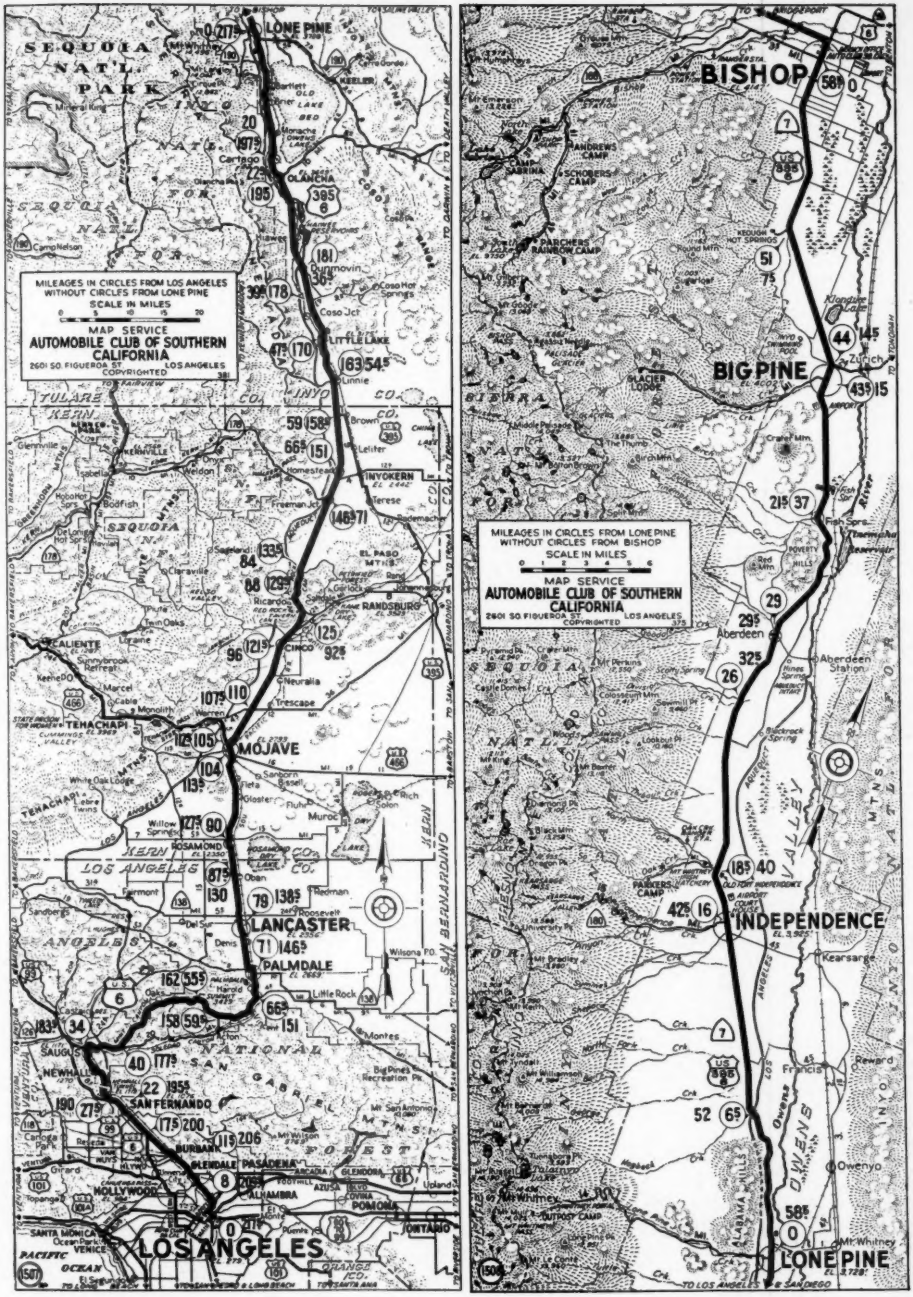
sediments are left behind and the hard rock mining districts are entered. Many of the igneous intrusions in this region are mineralized and prospect holes dot the surrounding hills. Antelope valley itself is covered with what is probably a Miocene lake deposit and when irrigation water is available it becomes rich agricultural land. The most impressive feature of this district is the Joshua tree. Thousands of acres are covered with this grotesque member of the lily family. The trees are from 10 to 30 feet high and have a very pithy construction. They have no commercial use as they are too weak for timber or lumber. An unsuccessful attempt was made to manufacture paper pulp from them.

The road passes close to the Golden Queen mining district where there is renewed activity at the old mines. The mines in this district have been operating for many years but a few years ago a new strike was made uncovering large low grade gold ore bodies and several large mines are now working. They include the Golden Queen, Elephant Eagle, Monarch, National and Whitmore mines. The latest type of cyanide mills have been installed for the recovery of gold and over 95 percent of the gold is recovered from the ore.

Randsburg, California's most diversified and richest mining camp, is but a few miles off the road to the right. The early gold boom spread the camp's fame to all corners of the world. The tungsten recovered did much to fill our needs during the World War and the silver strikes added much to the camp's wealth. It has been estimated that the camp produced $16,000,000.00 in silver, $12,000,000.00 in gold and $16,000,000.00 in tungsten from mines within a two mile radius. The scheelite was identified in a railroad cut after it had been exposed for years and passed unnoticed by thousands of trained mining men. The camp is now operating on a small scale and fine scheelite "spuds" are found in the desert. These "spuds" are nuggets of scheelite that have been concentrated in the loose alluvial deposit in much the manner of gold nuggets. Underground scheelite mining on the well defined vein is also carried on. Beautiful specimens of pyragyrite (dark ruby silver), and prousite (light ruby silver) have been found in the silver mines at Randsburg.

On our road ahead is Red Rock canyon, a beautiful sight in the early morning hours. The desert sun throws strong shadows on the deeply eroded walls of the canyon and intensifies the rich coloring of the sedimentary rocks. The beds are tilted to the west and have been capped with a thick layer of lava. The boundary between the black eruptive rock and the red sedimentary rocks is very straight and flat showing that the beds had been tilted and worn down before the eruption covered them with a mantle of igneous rock. The volcanic mantle covering of the canyon walls to the east is several hundred feet higher than the same covering on the west walls indicating the presence of a fault along the bottom of the gorge. It is hard to pass up the opals found in the amygdaloidal basalt close to the head of Red Rock canyon but other minerals call us.

Trona, 38 miles east of the highway, is the scene of California's largest mineral extraction plant. Explosives, picks, shovels, drifts, shafts and hoists are not common in this camp. The Trona minerals were deposited, along with the minerals of the dry lakes extending far south of Los An-



Reproduced by permission of the Automobile Club of Southern California.

egles, at a time when the Mojave desert was well watered. Large rivers washed the salts from the mountains as far north as Bishop and carried them down through a long string of lakes, probably terminating near what is now Dale dry lake, due east of Los Angeles. The climate became dryer and this river dried up. A series of dead lakes were left a number of which had impervious clay beds many feet below the existing lake bottom. Where this condition existed the salts contained in the water were concentrated in the subsurface water and a thick brine was formed. Wells are drilled through the dry lake bed at Trona, and other dry lakes, to tap this underground reservoir of brine. The brine is pumped to the extensive plant of the American Potash and Chemical Company and the water evaporated. The minerals crystallize out in a definite order depending on their relative solubility and a great variety of chemicals and minerals are extracted.

Beautiful crystals are recovered from the cores while drilling the brine wells and these are prized by mineral collectors. Halite, hanksite, thenardite, sulfohalite and borax crystals are often found having all faces perfect.

Our road now passes through a region of recent volcanic activity. A splendid river of lava is visible in the hills a few miles south of Little Lake. This lava flowed through a narrow valley high in the hills and continued in a narrow stream for about a half mile down the steep slope of the mountain. When it reached a gentle slope is broadened out into a fine delta of lava and cooled. Volcanic bombs cover the country for miles around and in several places cliffs of lava are exposed close to the road. These flows are so recent that erosion and weathering have had little effect on the lava. It is still a rich black color and the termination of the flows retain much of their original form.

We meet with several other cars containing mineral collectors, at Little Lake, and at 9:00 o'clock we are ready to press on in search of minerals. A fine volcanic cone, a few miles north, attracts the attention of all passers. It is built of scoriaceous basalt (cinder) that has blown out at a very recent age. The crater has retained its form perfectly although the entire cone is built of loose cinder. The lava did not flow from the top of the cone, which served only as a gas vent, but from cracks at the bottom. This is typical of many of the cinder cones that dot the California and Arizona desert.

We leave the main highway and follow the dirt road to Coso Hot springs. At Coso, signs of subterranean heat are abundant. The hot mineral waters have been known for their medicinal value since before the coming of the white man. Indians still come to the springs for treatments and modern accommodations are available for the traveler. An interesting cinder cone near the springs has dammed a canyon so recently that the water has not yet cut its way through the loose basalt. The surface of the land for miles across the mesa is covered with volcanic ash and lava flows.

Retracing our steps a few miles brings us to a cinnabar mine of low grade. This mine resumed operations in the past year due to the increased demand for mercury. The deposit was formed in the Pleistocene age by ascending volcanic gases. These gases altered the rhyolite to bentonite. Cinnabar was deposited in streaks near the surface as the gases cooled rapidly. The mining operations are carried

on in shallow open pits, seldom over ten feet deep. The ore is roasted on the property in a small still, the sulphur escaping as a gas. The mercury volatizes and is condensed in the still. The balance of the material remains in the furnace until the process is completed and the residue is removed.

On the top of the same mountain is the Devil's Kitchen, an area of active fumaroles. Sulphur fumes fill the air and the ground is hot under foot. The acid in the rocks eats cotton gloves and some members who sat down to dig lost their trouser seats. Mineral formation was proceeding in full view. Sulphur crystals were developing on twigs and weeds that had blown into the gas vents transforming them into yellow gems. Metamorphism had transformed the entire area to bentonite. Sulphur crystals had formed under the surface crust and many beautiful specimens were obtained. Under the layer of sulphur was cinnabar of good color but small economic value. There has been no commercial development of the cinnabar or bentonite deposits in the Devil's Kitchen but extensive test pits and trenches have been dug.

We follow a side road for several miles to another Indian gathering spot, a large flow of fine obsidian. Arrowheads thought to be made from this obsidian flow have been found great distances away. This was a favorite source of material for the Coso Indians arrowheads and many fine jet black arrowheads have been found in the surrounding hills. The flow covers the top of a large mesa and probably flowed down into a deep ravine. The termination of the flow has been eroded and a talus of obsidian forms the canyon walls. White "eggs" or spheroids of cristobalite are common inclusions in the black obsidian. Cristobalite is silicon dioxide that has formed at temperatures above 1100 degrees and is sometimes called high temperature quartz. The spheroids are hollow and when broken open expose typical octahedrons of critobalite. Some small flat crystals of fayalite were found on the octahedron faces of the cristobalite and these specimens are highly prized. Near the upper end of the canyon the obsidian showed well defined flow lines. The cristobalite inclusions in this section had been drawn out until some were only one-quarter inch thick and two inches long. These specimens showed that the obsidian had been flowing after the cristobalite had been formed. When the specimens were found in place they clearly showed the direction of the flow. After leaving the obsidian deposit we return to the main highway and head north for Bishop, one hundred miles away.

Owens lake is soon reached. This is the northern-most lake from which minerals are recovered. The water is shallow and highly mineralized. Much of the evaporation of the brine is carried on in open fields. The main chemical recovered is sodium carbonate. Old shore lines, two hundred feet above the present lake, show the way the water has receded cutting Searles dry lake, China dry lake, and the entire string extending to the San Diego county line from their supply of water. Owens lake was a large body of water before the Los Angeles aqueduct diverted water from the Owens river. Northeast of the lake is the Cerro Gordo mining district which was discovered in the 1860's. In the 70's, steamboats operated on the lake transporting ore from the east shore to the railroad and supplies back. The Cerro Gordo is California's richest silver, lead, zinc

mine. The silver ore in the mine averaged over $300.00 a ton and several million dollars in silver were recovered. It has been said that at one time two million dollars worth of silver bullion were stored on the shores of Owens lake awaiting shipment. The silver was associated with galena and the slag dumps were so rich in lead that they were reworked during the World War. In 1911, rich lead carbonate ores were discovered and the camp had its second boom. Many interesting specimens have been found in the Cerro Gordo. Specimens of smithsonite, linarite, galena, calcite and fluorite can still be found in the old drifts and on the dumps.

We continue north to Lone Pine, at the foot of Mt. Whitney. The Sierra Nevada mountains have been on our left for over a hundred miles and here they rise to their highest elevation. It is interesting to note that on a clear day it is possible to stand on Mt. Whitney, 14,496 feet above sea level, the highest point in the United States, and look down onto the floor of Death Valley, 276 feet below sea level, the lowest point in the United States. The east flank of the Sierra Nevada is reported to be the highest fault scarp in the country and at Lone Pine the sheer cliffs raise over 10,000 feet from the valley floor. The entire Sierra Nevada range has been uplifted along the east fault and for over four hundred miles the east slope is very steep while the west slope is gentle. Most of the moisture collected by the clouds over the Pacific Ocean is lost on the west slope and the land east of the Sierra Nevada is dry and barren. Owens valley formerly had abundant water from the glaciers and snow fields on the summit of the range but this is now piped to Los Angeles for the domestic water supply.

The Alabama hills, at the foot of Mt. Whitney, are an interesting geological remnant. Their drainage is toward the Sierra Nevadas showing that they at one time drained directly into the area now occupied by the Sierras. They therefore must have existed before the Sierra Nevada uplift.

The Inyo mountains are becoming more prominent on the east and volcanic ash, cinder cones and igneous rocks are giving way to sedimentary and metamorphic rocks. These mountains contain many interesting mineral deposits and mines which must be saved for other trips. Memories of the 1937 Rocks and Minerals outing come to mind. We pass the aquamarine deposit where small blue beryl crystals were found and the Reward mine where linarite, azurite, malachite, pyrargyrite, and dendritic manganese were collected. Most of the mineralization in this district accompanied igneous intrusions of the sedimentary rocks and many interesting contact minerals are found.

We reach Bishop after dark and are glad to get a good night's rest. Early the next morning we leave for the Champion Sillimanite mine above the town of Laws, near the Nevada line. The road passes over a perfect alluvial fan. From a distance one can see a fine profile of the steep slope near the base of the mountains tapering off in a graceful curve to a gradual slope far out in the valley. From the crest of the fan one can look down and see the spread of the foot and up to the narrow canyon from which the detritus has been washed.

We turn into the White mountains, a continuation of the Inyo mountains, at the Jeffery's ranch. The ore from the mine is stored at the highway near the ranch but we drive up past the

ranch, over a desert wash and into a narrow steep ravine. About six miles from the ranch we park our cars and start on a long hike to the mine.

The Champion Sillimanite mine is at an elevation of approximately 9,000 feet on the west slope of White Mountain peak. The ore is a high grade andalusite used in the manufacture of Champion spark plugs and high grade laboratory porcelain. The conglomerates, and finer grained sedimentary rocks of White Mountain peak, have been extensively cut by igneous intrusions. The andalusite occurs largely on the foot-wall of a quartz-monzonite dike. The original outcrop was discovered high on a cliff by tracing float up the canyon. The walls of the cliff were so steep that miners had to be lowered on ropes to blast out ledges from which operations could be carried on. Sufficient ore has now been extracted from the lenses to allow ample working space but the workings look more like cliff dwellers' ruins than a mine. The ore occurs in irregular lens-shaped bodies along the contact zone and the bulk of the mining is done by the caving method, that is blasting the roof of the stope until all the ore is removed and then removing the broken ore.

All ore is hand sorted at the mine and transported by mule back to the ore bins three miles away and three thousand feet lower. The mine has been an exceptionally fertile source of mineral specimens, partly because the original superintendent, Mr. C. D. Woodhouse, is an ardent mineral collector. Woodhouseite, a hydrous sulphate-phosphate of aluminum and calcium, was discovered at this mine and named after Mr. Woodhouse. Our sample sacks soon contained specimens of andalusite, lazulite, pyrophyllite, sillimanite and quartz. A few of the fortunate members added woodhouseite crystals, rutile crystals, hair-like tourmaline crystals and andalusite crystals.

From the andalusite mine we return to Bishop and turn north along the base of the Sierra Nevadas about 10 miles to Tungsten hills. A side road leads past a scheelite mill to the El Diablo mine. The mill is working tailings of an old mine that was active in 1918. As the material is already crushed, a tractor with bulldozer blade attached is used to move the ore to the endless conveyor belt. The ore is elevated to the top of the mill and run over a concentrating table similar in design to a dry gold concentrator. The scheelite being heavy is caught in the riffles and the gangue of garnet, epidote, and quartz passes onto the waste pile.

Another mill in the district is reworking a scheelite tailing in a slightly different and rather novel manner. The gangue at this mine was largely magnetite and almandite garnet. The tailings are run over an endless belt. A low intensity magnet is suspended over the belt to remove the magnetite and a high intensity magnet is suspended farther along to remove the almandite garnet. The material remaining on the belt is commercial scheelite concentrate and the garnet recovered on the high intensity magnet is sold for abrasive paper.

The El Diablo mine, a short distance up the canyon, has a long but intermittent production record. Many hundreds of feet of main drift have been run and the ore is removed by stoping from the main level upward along the vein. The scheelite is finely disseminated through the ore and is not readily visible to the naked eye. A portable ultra violet light is used to assist in tracing the vein and rejecting

waste material. The scheelite occurs in a contact zone associated with garnet and epidote. The scheelite decreases and the garnet and quartz increase as the contact is approached. Beautiful specimens of small almandite garnet crystals on massive quartz are common along the contact. Crystals of epidote are also found but they are not as perfect nor as plentiful as the garnet.

Another night is spent in Bishop and in the morning we head for the Rossi scheelite mine to the south. The Rossi mine is an open cut following old workings and enlarging the vein. Fortunately we arive as a blast is being prepared in the open cut and we have the opportunity of seeing it fired, the smoke clear and a new face exposed in the workings. The Rossi mine is in decomposed rock but good specimens of scheelite were obtained. The dumps also yielded some fine specimens of chrysocolla and garnet crystals on quartz.

From the Rossi mine we return to the main highway and go south to Independence. A side road is taken to Kearsarge and up Mazouaka canyon to the Whiteside mine. This is an old silver-lead mine but the vein has been lost. The hillsides are honey-combed with drifts and pits dug in an attempt to pick up the continuation of the silver ore. The silver is still missing but the dumps yield nice specimens of galena and cerussite and several nice pieces of aragonite. This is our last collecting locality as Los Angeles and home are 240 miles away.

The long drive home gives us a chance to appreciate the many things we have seen and done. We have a better knowledge of the eastern part of California and the way the Sierra Nevada uplift changed a land of abundant rain to a land of little rain. The uplift formed a great desert valley relying on the melting snow of the high mountains for its water. We trace the formation of the dry lakes which produce such a plenty and diversity of chemicals.

We follow the Los Angeles aqueduct from its source above Bishop over 270 miles of desert. This brings out the way geology influences the growth of our cities. The rich agriculture lands of Antelope valley can thank their existance to the heavy rainfall of Miocene time when deep deposits of silt were laid down in the large inland lakes. We see how changing world conditions alter the reward obtained from mining certain minerals. When the world is peaceful the cinnabar and scheelite mines of Owens valley are quiet but present unrest has created a new interest in many old mercury and tungsten deposits.

Geology takes on a very personal aspect. Standing on an active fumarole, with the ground hot under foot, gives one a new view on mineral formation. The altering of igneous rhyolite to metamorphic bentonite shows how gas and heat alter rocks until their origin is hard to determine. Recent lava flows, volcanic bombs, and specimens of obsidian serve to illustrate eruptive igneous rocks. The great Sierra Nevada fault scarp, ancient shore lines above Owens lake, wind erosion on the desert, tilted and faulted Red Rock canyon, and interesting exposures in recent road cuts keep the mind active all the way home.

We think of the many unusual things seen that we are not apt to see on other trips. The old Pico canyon oil field with its wooden derricks, the Joshua trees of the Mojave, the active fumaroles at Devil's Kitchen, and the highest mountain in the United States.

Time prevented our inspecting California's largest mineral extraction plant at Trona, active glaciers and their cirques above the town of Big Pine, and the San Andreas fault which we crossed and which is responsible for many of California's earthquakes.

The car is heavy with the large number of minerals collected on the trip. Many pleasant nights are in store for us in cleaning, testing, classifing and trading our new-found specimens. We have added to our mineral collection many interesting specimens. Our crystal groups now include native sulphur, almandite garnet, epidote, fayalite, aragonite, and if we were fortunate woodhouseite, rutile, tourmaline and andalusite. Massive specimens include obsidian with cristobalite inclusions, galena, andalusite and sillimanite. The ores include andalusite, cinnabar, scheelite and galena. Gem collectors have added almandite garnet, epidote, chrysocolla, and a short side trip would add blue beryl crystals, howlite and amazonite.

For those not interested in geology, mineralogy, gemology and things unusual, there is good hunting and fishing in the Sierra Nevada mountains.

FOSSIL RAINDROPS IN COLORADO

"For lo! the winter is past, the rain is over and gone—" (Song of Solomon)

—but its trace may linger for millions of years.

In fact, fossils of rain drops that fell in Colorado about 250,000,000 years ago, were placed on exhibition recently at Field Museum of Natural History, Chicago, Ill. They were collected last summer in the mountains of the northeastern part of the state, in the vicinitly of Boulder, by Sharat K. Roy, curator of geology, while conducting the Sewell Avery Geological Expedition.

The position of the marks, the depth to which they dug into the terrain, and the slant at which they occur, indicate that they must have been driven by a terrific northeast gale—a storm of such intensity as perhaps has not been seen upon the earth since there have been men to worry and complain about the weather, for this occurred approximately 249,000,000 years before the earliest human beings are believed to have existed. The marks made by the rain drops apparently were protected from obliteration by deposits of sediment which accumulated and covered them. Then, in the course of time, the sands into which the rain fell became cemented into rock, preserving the raindrop marks to this day, says Curator Roy.

U. S. CIVIL SERVICE OPPORTUNITIES

For those who are interested we are pleased to announce the following open competitive examinations to be held in the near future by the U. S. Civil Service Commission.

	A Year
Senior Mineral Economist.....	$4,600
Mineral Economist	$3,800
Associate Mineral Economist..	$3,200
Assistant Mineral Economist..	$2,600

Applications for the above examinations must be on file with the Commission at Washington, D.C., not later than March 13, 1939.

Full information may be obtained from the U. S. Civil Service Commission, Washington, D.C., or from the Secretary of the U. S. Civil Service Board of Examiners at the post offices or custom houses in large cities.

METHOD FOR MOUNTING SMALL SPECIMENS IN VIALS

By EUGENE W. BLANK

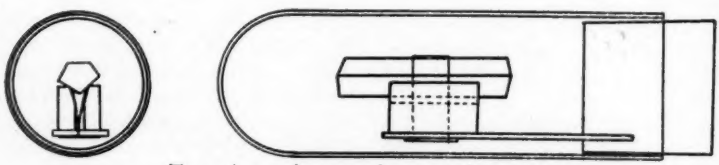
It is common collection practice to mount crystals and small mineral specimens on cotton in stoppered vials. Such a method of mounting has the disadvantage that only one side of the specimen is available for examination and removal of the specimen from the vial is rendered difficult by the presence of the cotton which must first be removed, usually by means of a forceps.

The drawing shows a convenient method of mounting small specimens. Among other advantages the specimen can be examined from all sides, with the exception of a small zone underneath and near the center which is hidden by the mounting. In addition, if necessary, the specimen can be readily removed for a more extended study.

In view of the attached drawing a detailed description of the method of mounting is not required here. Doubtless many readers will wish to modify it in such respects as will more nearly meet their desires and requirements.

In brief the crystal or specimen is held against a mount consisting of two cork segments by means of a thin strip of cellophane. The cork mount should be carefully cut to shape with a sharp blade and painted black with India ink. The cellophane strip is placed around the specimen and the ends passed between the cork segments comprising the mount and thru a sli. in the stiff cardboard that supports the whole assembly. The ends of the cellophane are fastened by a thin strip of gummed paper. The cardboard strip is itself fastened in the stopper of the vial. Ambroid cement should be used in fastening the various parts of the mount as it dries rapidly and is superior in many ways to ordinary glue. More important any residual fumes from the cement will not tarnish metallic minerals.

Data concerning the specimen can be written on the back of the cardboard strip and it can be read without removing the specimen from the vial. Instead of fastening the cardboard strip to the stopper it can be wedged between the stopper and the neck of the vial. In the latter case a small projecting tab should be left extending outside the vial in order to facilitate removal of the specimen.



Two views of a crystal mounted in a vial.

"THE MINERALS OF FLORIDA"

By R. EMMET DOHERTY
Pres. R. & M. A.

In the year of 1513 on the second day of April, a Spanish adventurer, one Ponce de Leon, landed on the site of St. Augustine, Florida, searching for the Fountain of Youth. No waters with the magical powers of turning back the clock were ever found, but instead, a land of sunshine and flowers, luscious fruits, tropical splendors and a climate exquisitely delightful. A state within whose borders lie 30,000 lakes, tall green palms, stately towering pines, giant oaks draped with feathery spanish moss, Lignum Vital, heaviest and hardest wood known to man, many rooted Banyan trees, massive evergreen Cypress and the giant Eucalyptus which often reach a height of 400 feet.

Endless tales have been told of the tropical splendor of the state of Florida, of it's rich farm products, it's immense sponge fisheries, it's vast shrimp industry, it's turpentine and rosin production, but what about it's minerals?

First, with the exception of Louisiana, Florida has the lowest average elevation above sea level. The highest elevation is in the central divide 100 to 274 feet above sea level. Most of the terrain is composed of finely disintegrated shell, marl, clay and in some parts of the state almost pure silica sand. Rock outcrops are practically non-existant and on casual observation the state presents a disappointing aspect to the mineralogist. But the minerals of the state are vastly more important than appear to be generally recognized. Untold wealth lies underfoot waiting for exploitation. The total mineral production for 1935 was $11,569,110. Some of these money makers are as follows:

PHOSPHATE—Florida ranks first in the production of this valuable ingredient of fertilizer.

FULLER'S EARTH—A variety of clay used in the clarifying of mineral and vegetable oils and fats, also used in the manufacture of white ware products and as a filler and adulterant in various commercial products.

KAOLIN—A white-burning clay which is used in the manufacture of the best grade white ware products.

DIATOMITE—A very high grade earth consisting of one celled marine plants or algae which is used as a filtering medium and also a high grade insulation material. Because of it's great moisture absorption powers, diatomite is being pressed into discs and used to top an ever-dry salt shaker manufactured in the state. This is the first efficient moisture proof shaker I have ever seen.

PEAT—Found in abundant quantities in almost every county in the state. Mainly used as fertilizer filler or for soil improvement in nurseries, on lawns and shrubbery. Not used as fuel.

FLINT—The silicified limestone which is commonly called flint is used as a building stone in the rough. Flint is also crushed and used as railroad ballast and as an aggregate in concrete. One locality visited was the M. M. Thomas Flint Rock Corp. located on Route 441 five miles north of Ocala. Large irregular masses are found on the surface of the ground, or slightly buried. These weigh from fifty to several hundred pounds each. Their surfaces are generally covered with a white chalky limestone while the interior consists of a hard, tough silici-

fied limestone running from pale grey in color to dark brown. In some of the cavities which occur in these masses can be found a gem quality *agate*, in mammillary form, banded grey and brown, lining the cavities up to six inches in diameter. Other minerals found in these thick geode-like formations are *drusy quartz, chalcedony, chalk, calcite*; also finely outlined shell imprints of all descriptions.

LIMESTONE—Vast quantities of limestone underlie the state and are used in the manufacture of cement, concrete, road material, building stone, lime and manufactured products. At the plant of the Cummer Lime & Manufacturing Co. on Route 441, four miles north of Ocala the limestone bed here has been quarried to a depth of about 50 ft. The excavation is 200 feet wide and 400 feet long. The overburden is only from 1 to 3 feet thick and the white limestone is so soft and pure that it can be cut out of the quarry walls with a sharp spade. During a half hour visit here no minerals were found but the surface of the ground was generously sprinkled with silicified limestone nodules, some bearing agate.

COQUINA "ROCK"—This soft, light colored, coral-like stone is composed of broken shells that have been cemented together during the prehistoric ages. It can be readily carved, trimmed or faced and makes an excellent building stone. It was used by the Spaniards in building the old fort at St. Augustine in 1672. The walls of this fort are from 9 to 12 feet thick and it is one of the oldest fortifications still standing in the United States. Other fine examples of the use of this stone are the new Community Centers of St. Augustine and Daytona, the Bok Singing Tower at Lake Wales and many of the U. S. Postoffices, clubs and private homes throughout the state. On Anastatia Island, across the Matanzas River from St. Augustine, is situated a great number of these coquina quarries dating back to the time of the Spanish possession of Florida. Some of the foundations and chimneys of the quarrymen's homes are still standing, 250 years old.

Much of the sand of the state contains valuable minerals. At one time, during the World War, a plant was operated near the beach a few miles south of Jacksonville, for the recovery of *rutile, zircon* and *ilmenite*. Other rocks and minerals reported in the state are *dolomitic limestone, ochre, magnetite (granular)*, oolitic and coralline *limestones*.

While strolling on the beach near Ponte Vedra, the sand was heard to emit a loud squeaking, very similar to new snow on a frosty night. The writer could not determine what caused this phenomenon, commonly known as singing sands, as it did not take place a mile either side of the locality.

The mineral waters pour from springs in vast quantities throughout the state and are of great value. One of the best known is Silver Springs at Ocala. This spring has probably the greatest flow of water of any spring in the world, 22,134,780 gallons an hour. Both freight and passenger boats are able to navigate the river created by the spring and this circumstance makes one of the few rivers of the world navigable to its source. The water at Silver Springs is so clear that the bottom can be viewed easily at a distance of eighty feet thru boats with glass panels set in their hulls especially for this purpose. The subterranean river comes up out of the earth thru a vast limestone cavern 65 feet long and

12 feet high which lies at the bottom of a circular basin which forms the head of the Silver River. Around this basin over a million dollars has been spent in beautification to grounds and buildings. The bathing beach here boasts of water maintaining an even temperature of 72 degrees all year round. A trip in one of the glass bottomed boats over this subaqueous fairyland is an experience never to be forgotten. The beauties of the marine life, both plant and animal, brightly illuminated by the sunshine filtering down thru the crystal clear water cre ates a picture no artist could paint.

Although Florida is not known for its minerals it has nevertheless one locality that is world famous—Tampa Bay. For over 100 years, some of the finest petrified corals known have been collected along its beaches or brought to light during dredging operations. These corals have changed into chalcedony and are known as "chalcedony pseudomorph after coral". Opal (cacholong), flint, agate and drusy quartz also occur here.

For those members of the Rocks and Minerals Association who may be planning to spend a few weeks in Florida and who would like to know more about the State's mineral occurrences, we would suggest that they secure a few of the bulletins that are still available. Write to the Florida Geological Survey, Tallahassee, Fla., for a list of available publications and from this list order those that may be of special interest to you.

AN INTERESTING SPECIMEN

By PETER ZODAC

We recently obtained a specimen from New York City of which we are very proud. The specimen is 3x1x¾ inches in size, made up of two rocks, pegmatite and a small amount of biotite-muscovite schist, and consists of ten species of minerals. Though none of the species are of exceptional quality, nevertheless the specimen, coming from the world's largest city, is of more than passing interest. The minerals occurring in the specimen are:

Apatite: Small green crystals in pegmatite.

Biotite: Black lustrous flakes with muscovite in schist.

Dumortierite: Azure-blue fibrous aggregates in pegmatite.

Garnet var. Almandite: Small red crystals in pegmatite.

Limonite: Brown stains on pegmatite.

Muscovite: Small white flakes in pegmatite; also in schist.

Oligoclase: Small flesh-colored masses

Sillimanite: Small, gray fibrous masses in pegmatite.

Tourmaline: Small black crystals in pegmatite.

The specimen was found, many years ago, at 119th Street and Lexington Avenue.

CHALCEDONY NEAR GERONIMO, ARIZONA

Some very interesting botryoidal chalcedony, pearly to dark brown in color, and of good quality, has been found by J. H. Cook of Geronimo, Graham County, Arizona . The locality is 6 miles northeast of Geronimo in the Gila Mountain Range. The chalcedony occurs in veins which vary in width from ¼ up to 2 inches, penetrating various rocks. The mineral is very plentiful; on one trip to the locality about 2,000 specimens were collected that ranged in size from small up to 8 x 10 inches.

THE MINING INDUSTRIES OF THE DOMINION OF CANADA

By RICHMOND E. MYERS

The Dominion of Canada should be of especial interest to anyone who professes to be an economic mineralogist. Altho we do not associate our northern neighbor with the great mineral producing nations of the world unless we think of the famous Sudbury monopoly, nevertheless Canada contains one of the world's largest areas for potential mineral production. This is the region between the western shore of Hudson's Bay, and the Alaskan border. Geological exploration of this area is going on to a greater extent than that of any similar region in the world with the possible exception of that part of the globe controlled by Soviet Russia. The most recent method of exploration has been from the air. Photographs taken from airplanes and made into maps show the trained eye exactly which sections of the vast wilderness bear closer investigation on foot. In just such a manner the Labine Point pitchblende deposits were found, altho at the time gold was the object of the search.

Mining is an important industry in Canada today, altho only 1½% of the adult male population happen to be engaged in it. However, this number includes only those who are actually digging and delving, so we can assume that a large number of workers in offices, transportation activities, technical forces, and the like, would swell the total number considerably.

In examining Canada's mining industries we must keep in mind the fact that we are interested in this topic from an economic viewpoint, and can consider only those operations in which the ore may be easily extracted at a profit. This means that the mineral can be marketed with the least possible cost to the producer.

It will be best to arrange a brief classification of Canadian minerals at this point. One may easily group them into three classes, the first, those present in large enough quantities to make Canada an important world producer; the second, those present in large enough quantities to be mined generally for Dominican consumption; and the third, those having great economic importance, but so remote or so insignificant that development is scant. We shall consider these in order.

CLASS ONE

Undoubtedly nickel should head the list of Canada's important mineral products in this class. The famous Sudbury Region north and east of Georgian Bay, is today the largest nickel mining region of the world, producing 90% of the total supply. This glorious bonanza is under the control of the International Nickel Company, and is truly a world monopoly. The ore is a ferrous sulphide with high nickel content, occurring in the basic igneous rocks of the Canadian Shield. Associated nickel bearing minerals are Millerite and Pentlandite.

Of all the minerals about which romance, intrigue, wars, and yearnings have cluttered, gold indeed should head the list. Canada contains within her borders three gold producing regions of major importance. In 1898 the attention of the world was centered on the Klondike, often thought of as being a part of Alaska. This misconception still persists, due in part to the poems of Mr. Service, and also to a lack of geographic

knowledge. Be that as it may, the Klondike still produces gold, largely in placer workings. So also do the coast ranges of British Columbia, where both placer and vein mining are used. It was in this region that the famous Premier Mine produced in 1931 one quarter of Canada's gold output. This mine is just about finished however. The next year it produced but 6% of the total. The fate of all mines has overtaken it. The gold regions of Canada that today are bearing the brunt of production are those of Ontario. These Shield deposits, worked to the depth of 4000 to 5000 feet, giving ½oz of gold to a ton of ore, are today turning out three quarters of the Dominion's yellow metal. The two best known of the districts are the Porcupine Region and Kirkland Lake Section. Gold is found elsewhere in the Laurentian Highlands, and is mined with silver in the Cobalt area. It is in this Shield region that the gold rushes of recent years have occurred.

Of far greater value than gold is the element radium. Just below the Arctic Circle on the shores of Great Bear Lake, two air-minded gold hunters who were returning from a summer's prospecting, noticed from the airplane in which they were flying the peculiar formation of a point of land jutting out into the lake. The next season they returned and investigated this point. Their deductions were correct. Deposits of pitchblende were waiting for the finders to claim. This tale reads almost like a fairy story. Geologists who were taken to the locality felt that it would not warrant development, they even doubted that the ore was pitchblende, yet the prospectors, Charles and Gilbert Labine, had faith in their mine, and today, via the air, radium is being sent down into civilization from Labine Point, where ten tons of the "blende" produced one gram of the precious element. Thus Canada is one of the world's leading radium producers.

A more prosaic mineral is asbestos, and yet rivaled only by the South African output in recent years, the province of Quebec gives the Dominion claim to another class One deposit. In a serpentine belt running from East Broughton south west (via Thetford and Richmond) over the border into northern Vermont, the Canadian asbestos has an excellent advantage over competing deposits in its easy access to water transportation (St. Lawrence River) as well as its nearness to the northeastern manufacturing regions of the United States. The variety of asbestos occurring here is an excellent cross fiber chrysotile.

Another mineral deserves a place among the class One deposits and that is gypsum. Canada is a leading exporting nation of this product, sending the bulk to the United States. One reason in particular makes this possible. The location of the chief deposits lies along the northern coast of Nova Scotia directly north of Halifax, and thus water transportation is furnished to the Atlantic seaboard for easily worked masses of gypsum. The enormous thickness of the beds renders quarrying costs fairly low, and the high quality of the product assures a market. The Nova Scotia region is in itself the world's leading exporting center. In southern Ontario there is a continuation of the deposits of Gypsum as found in the Silurian deposits in New York State, but these are only of minor importance when compared with the maritime operations.

CLASS TWO

To attempt in these pages to give a

detailed record of all the minerals that could be listed in this group would monopolize my entire paper. It will be best therefore to confine this discussion to the more important deposits that can and do supply the Dominion markets, with little or no surplus for export.

A great many minerals of economic importance are mined in the famous Sudbury Region. Many of these occur as secondary minerals with others that form the major deposit. (I use the term secondary in its economic, not its mineralogical sense.)

Copper has long been mined in these sections. The largest operation is of course at Copper Cliff, Ontario, where 68% of the Dominion's output is mined and smelted. Most of the ores are sulphides, and the mines are owned by the International Nickel Company, who happen to be the world's sixth largest copper mining concern.

Not very far from Copper Cliff is Cobalt, a region formerly well known for its silver mines, but today producing a fair supply of Arsenic, Bismuth, and Cobalt. The silver production has been rapidly moving into a class Three category, for the bonanza seems to have spent itself as far as the white metal is concerned.

These are the principal ores of the Shield province. Several of them occur elsewhere. Copper for example is also mined in fair quantities from the famous "Line Mine" situated in Manitoba and Saskatchewan, as well as the Rouyn Mine in Quebec. (This mine is geologically in the Shield province.)

Lead and zinc are both produced in Canada with a large enough output to be placed in class Two. As elsewhere these two metals occur together, but the Canadian output centers largely in one locality, the famous Sullivan Mine in British Columbia. This operation produced over 90% of the Dominion's supply of both minerals in 1935. The ore is of similar nature to the Coeur D'Alene deposits to the south in Idaho, but is considered by some geologists to be of richer quality. Small mining operations are being conducted for both of these minerals in Ontario, Quebec and Nova Scotia. The region around the Great Slave Lake is considered a potential source in the future.

Centering in the provinces of Ontario and Quebec, and lying in a triangle with Sudbury, Ottawa, and Kingston as the points, is Canada's Feldspar mining region. In this great precambrian area an abundance of pegmatite dykes make possible the development of this industry, which is of considerable importance to the Dominion. Canada is the second producer in rank of the British Empire, and were it not for the enormous production of the United States, I would probably place this mineral under the first class. As would be expected a considerable variety of pegmatite minerals occur in this area, and the mineral collector would find his time well rewarded by a journey thru this region. However, none of these are of commercial importance, and must therefore be passed by at this time. All the known varieties of Feldspar occur.

CLASS THREE

Perhaps of the minerals Canada lacks and needs the most, coal should head the list. More than half of Canadian coal consumption is from imported material. The Dominion has coalfields of enormous extent, so far worked only where there are special facilities for commerce. These are:

1. Northern Nova Scotia, and a very small area in New Brun-

wick. Both have port facilities, and produce a bituminous that may be coked, tho the ash and sulphur content is high.

2. Vancouver Island has a fairly good grade of bituminous, with the development of a possible market via the sea route to Pacific coast markets, however, the grade is not high enough to compete with other sources.

3. The Carcase Valley in Alberta, with an estimated 400,000,000 tons of low grade anthracite, but as yet, no railroad.

These are the only areas of any importance in Canada's coal mining industry, and one of them (the last) is really a potential one, rather than an active producer.

Iron is simply lacking in anything like good workable and accessible deposits that could be profitably worked. Three regions might possibly be developed, for iron mines have been opened in these sections, but the probability of any boom is exceedingly doubtful. These are, (1) the east coast of Hudson's and James' Bays, (2) mines in the Shield province, and (3) the district between the Lake of the Woods and Lake Superior.

Petroleum, the power for which modern nations may well go to war, is also absent in anything like worth while proportions. A small deposit with a paraffin base is found in New Brunswick, another in southern Ontario, but having unfavorable geological conditions, development is very unlikely. Northern Alberta and the Mackenzie Valley have outcrops of tar saturated sands and oil seepages, as well as asphalt matter. So far these regions have been too isolated for any exploitation. The Turner Valley in Alberta appears to be the only region that looks promising, for here shale oil is produced, but as yet no pools have been found altho their existence is suspected.

Thus we see Canada is an important mineral producing region of the world. Her possible expansion along these lines is bound to come as scientific prospecting brings to light new deposits and transportation gradually reaches the remote areas that may not be opened until scarcity elsewhere will make the investment pay.

This outline does not in any way aim to be a complete statement of the Dominion's mining industries. Many have not been mentioned that might be of interest to a mineralogist, but I have tried to sketch the importance of the Canadian industry and indicate from an economic point of view its potentialities as well as its wants.

1935

CANADIAN MINERAL PRODUCTION

CLASS ONE

Nickel	138,516,240 lbs.
Gold	3,284,890 fine oz.
Pitchblende	no figures
Asbestos	216,467 short tons
Gypsum	491,572 met. tons

CLASS TWO

Copper	420,000,000 lbs.
Lead	339,105,079 lbs.
Zinc	160,325 tons
Feldspar	18,881 met. tons (1931)
Pyrite	115,000 met. tons

NEWFOUNDLAND

Hematite	629,179 tons
Fluorite	10,000 tons

Class three figures of too little significance to quote.

SHATTERED CRYSTAL CAVITIES OF THE PATERSON DISTRICT

By WM. C. CASPERSON

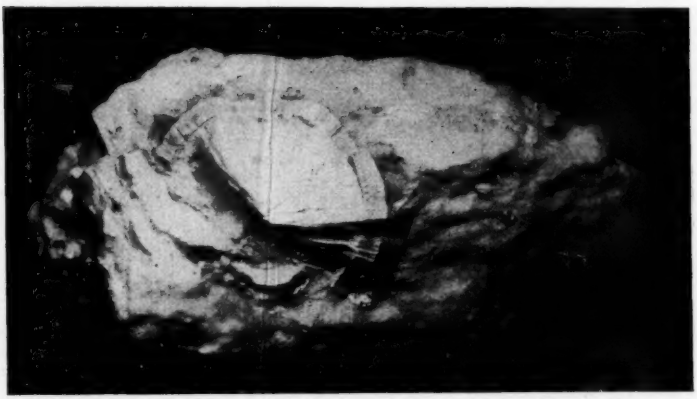
Faulted and broken crystal formations in the pockets or cavities of the trap rock in the vicinity of Paterson, N. J., and especially in the quarries on New Street, testify to what must have been terrific forces at work during some former period of the earth's history.

Pockets filled with the mineral thaumasite in which are embedded broken crystals of various minerals and even fragments of the trap rock are numerous. Crystals so found embrace apophyllite, calcite, datolite, heulandite, pectolite, prehnite, and others.

That severe upheavals occurred which disturbed and distorted the already formed crystallization is evident by many interesting examples of faulted crystals. The writer has in his collection a large calcite crystal, a section of which has slipped from its original position one-quarter of an inch causing a fault in the crystal. The two sections thus separated by the fault have been fastened together by a later calcite growth.

The specimen illustrated in the accompanying photograph is an example of crystal faulting due to one of the severe shocks. The specimen consists of one-half of a ball of pectolite, two inches in diameter, embedded in thaumasite. The face of the specimen exhibits a cross-section of the pectolite ball at its largest diameter showing the radius and the radiating structure of the mineral. About one-half of the radius is in its original position. The remaining one-half and much of its structure is so broken that the radius can be seen considerably out of its original position. The shell-like structure of the radius, as seen in the illustration, is due to the pectolite ball having been formed by a series of growths in its crystallization, each growth forming a layer, five of which are distinguishable.

It is evident that the pectolite was the primary mineral which formed in



A faulted pectolite from the New Street Quarry, Paterson, N. J.

this pocket. Then, some severe shock occurred which crushed and distorted the pectolite. Following this event a new mineral, undoubtedly anhydrite, filled the pocket allowing the broken crystals of pectolite to become embedded in it. Subsequently, the anhydrite altered to gypsum, and finally the gypsum altered to thaumasite, and eventually an imaginative mineral collector came along, picked up the specimen and then unfolded a page of the history of the past and made a few feeble deductions.

WITH OUR MEMBERS

Four members of the Rocks and Minerals Association are making a name for themselves, mineralogically. One of them is Clifford Frondel, of Massachusetts Institute of Technology, who is known as the "Pseudomorph King." "If you want to have any pseudomorphs identified show them to Frondel for he knows more about these fascinating forms than any other man living," is the consensus of opinions of those who should know.

O. Ivan Lee, of Jersey City, N. J., is the "Titanite King." Just show Mr. Lee a Titanite crystal from a new locality and await developments. Some mighty curious stories have been circulated about his search for the wedge-shaped crystals. One is that on seeing an interesting Titanite crystal from a new locality and after asking a few questions regarding directions how to reach the occurrence, he would mysteriously disappear and be gone for days; on his reappearance his face would be wreathed in smiles and his pockets bulging suspiciously.

Ernest Weidhaas, of Pelham, N. Y., is the "Prehnite King". Over 1,000 excellent prehnites are in his very fine collection and yet he keeps adding more to them. Where does he keep them, as many are large, magnificent museum specimens? We cannot understand his fascination for the green mineral. We are pretty sure he is not Irish!

Peter Zodac, Editor of ROCKS AND MINERALS is the "Molybdenite King". He recently had printed 3,000 special index cards on which to record his molybdenite specimens and those of future acquisition. One member thinks this is terrible. "Of all the beautiful minerals to choose from, how can a collector select molybdenite in which to specialize? Anyone who does this must be cracked!" "Cracked, nothing," retorts Zodac, "though I may be a little queer. Anyway, isn't one who is queer said to be a genius? Then besides, I have no competition."

John C. Pohl, Jr., of Easton, Penn., has an idea which we heartily recommend. He has had some post cards made on which are printed the photos of one or more specimens from his very fine mineral collection. Lucky indeed is the collector who receives one of these cards.

John M. Ulrich of New Haven, Conn., has returned recently from a collecting trip to Guatemala, Central America. His objective was jade and cinnabar specimens. On the slopes of San Pedro Volcano, at 6,000 ft. elevation, some nice vesuvianite crystals were found. We may receive an article from him covering the trip.

Attention members in New Mexico and Arizona! If you see or hear of a slender, good looking, lone female pounding rocks anywhere in your vicinity, be it on the desert, mountain top, or mine dump, do not get excited and call for the sheriff. It will be only Miss Helen Wright of Castle Point, N. Y., who is perfectly harmless. She is on a six weeks mineral collecting tour of your great southwest.

A MINERALOGICAL CROSSWORD PUZZLE

By WALTER P. SACHS

We are printing for the first time a Crossword Puzzle that has been constructed by Walter P. Sachs, one of our warm friends and members. You will note that "R&M" has been worked into the puzzle's "motif".

We would like to receive comments from our readers and if the response is favorable perhaps one or two more Crossword Puzzles may be printed in future issues of ROCKS AND MINERALS. (Editor)

1—Grouping of crystals (plural).
8—An element, component of calcite (symbol).
9—Dihydrite, pseudomalachite and ehlite have been grouped under this general name.
12—Thallium (symbol).
13—Crystal (abbreviation).
14—Boron, neodymium (symbols).
15—Important element of a nitrate, of a chloride (symbols).
16—A state where fine geodes occur (abbreviation).
17—An element, component of argentite (symbol).
18—One way of expressing: "two atoms of hydrogen" (symbols).
19—A state where hyalite is found (abbreviation).
21—An element, component of stibnite (symbol).
23—Hydrogen, iodine, uranium (symbols).
25—Number 10 in Dana's classification.
28—A diphthong of Latin origin, the beginning of half a dozen mineral names.
29—A southern state where gold has been found (abbreviation).
30—European country, site of a famous volcano.
32—Formula for bunsenite.

ACROSS

34—An element, component of monazite (symbol).
35—Termination in mineralogical nomenclature.
37—Hydriodic acid (formula).
38—Scandium (symbol).
41—Preposition denoting locality.
42—Variety of tourmaline.
44—A period of geologic time.
45—A southern state where extensive beds of hematite have been found (abbreviation).
47—Indium (symbol).
49—Measure of length (abbreviation).
50—Variety of garnet.

DOWN

1—Prefix from the Greek, used to indicate rays, as in the translation of "radiated stone."
2—Natrolite in colorless needles from southern Scotland.
3—Two elements, components of celsian (symbols).
4—Wolframium.
5—The terminal part of a crystal.
6—Cassiterite is an oxide of this element (symbol).
7—The process of producing figures on crystalline faces by means of acids.
10—Iodine, nitrogen (symbols).
11—An old spelling of a variety of allophane found near Bonn, Rhineland.
20—A rare element, first discovered in uraninite (symbol).
22—Bismite is an oxide of this element (symbol).
23—Holmium (symbol).
24—Next to oxygen, the most widely distributed of the elements.
26—Halite is a chloride of this ele-

ment (symbol).

27—The two elements which make up pyrolusite (symbols).

30—Prefix from the Greek which helps form the word meaning: "Twenty-sided solid."

31—An element, component of xenotime (symbol).

33—Iridium (symbol).

36—Breithaupt described this species and Dana says, "supposed to be a rock."

37—Term applying to the diversity of form of crystals of a given species.

38—A blast in mining.

39—Fibrous varieties of calcite and gypsum: "satin .....?"

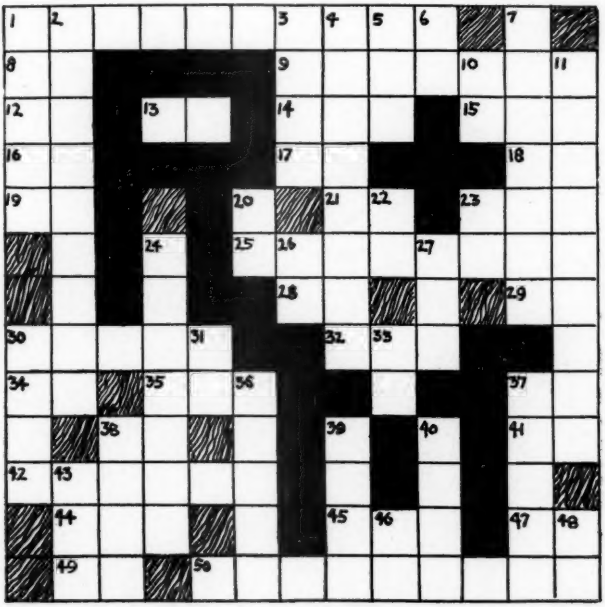
40—An element, rarer in a native state than gold.

43—Cerium, fluorine (symbols).

46—An element, associated with cerium (symbol).

48—Neon (symbol).

References: Dana's Textbook of Mineralogy, 4th edition by W. E. Ford.
A System of Mineralogy, 5th edition by J. D. Dana.



Try your skill with the above Crossword Puzzle—it's lots of fun. The answers to this puzzle will appear in next month's issue.

CLUB AND SOCIETY NOTES

Bay State Mineralogical Ass'n.

A new club, composed chiefly of high school boys and purposely kept to a small number of members which shall consist of very enthusiastic mineral collectors only, was organized Dec. 14, 1938, at the New England Museum of Natural History, Boston, Mass. Wm. D. D. Quinn was elected President and Warder Cadbury the Secretary-Treasurer. A talk on the minerals of Winchester, Mass., was given by Charles Frary at this meeting.

The president is extremely interested in corresponding with similar clubs throughout the nation. All correspondence sent to him should be addressed in care of the Association and Museum.

The Association meets on the 2nd Wednesday of each month at 7:30 p.m. at the Museum.

Chicago Club Elects New Officers

At the first meeting of the year, held on Sat., Jan. 7th, the Marquette Geologists Association, Chicago, Ill., held an election of officers. The following were elected to guide the activities of the club for the current year:

Thomas Scanlon, President.

Miss Genevra Dow, Vice-President.

George Huss, Secretary & Treasurer.

C. H. Hodson, Curator & Librarian.

Regular meetings of the club are held on the first Saturday of every month at 7:30 p. m. at 155 North Clark Street in the Marquette Institute. Visitors are always welcome.

Club Desires Bulletin Exchange

The East Bay Mineral Society of Oakland, Calif., desires to exchange its bulletin for bulletins issued by other clubs. Beginning with their January number, copies of the bulletin have been sent to all known clubs with the hope that these clubs will reciprocate either by bulletins, if published, or by post cards or letters. It is believed that in the exchange of bulletins, a fund of information and ideas can be built up by the various clubs cooperating.

The East Bay Mineral Society announces, furthermore, that it has arranged for a number of interesting field trips to be held throughout the current year. Members of the Rocks and Minerals Association, or of any club, who may be planning to visit the Golden Gate International Exposition which opened Feb. 18th, or who for any reason may be in San Francisco, Oakland, or vicinity, before this year is out, are cordially invited to join the Society on one or more of its field trips. For further information communicate with Mrs. F. W. Buhn, Secretary, 3027 60th Ave., Oakland, Calif.

Now that winter is drawing to a close and spring will soon be here, it is time to give some thought to the annual outing of the Rocks and Minerals Association which will be held in May. We hope all those directors who cooperated with us last year will again offer their services. We would be pleased, also, if more collectors would offer their services as directors for localities that were not represented last year.